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Elevated atmospheric carbon dioxide concentration increases *Eucalyptus* plantlets growth and reduces diseases severity

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Abstract

The impacts from elevated atmospheric carbon dioxide (CO₂) concentrations on forest systems have to be evaluated in order to develop adaptation strategies. The objective of this study was to evaluate the effects of high CO₂ concentration on eucalypt plantlets growth and on the severity of eucalypt rust (*Puccinia psidii*), Ceratocystis wilt (*Ceratocystis fimbriata*) and leaf-spot (*Cylindrocladium candelabrum*). The experiments for each pathogen were performed in open-top chambers (OTC) and closed chambers (CC). Two clones with different levels of rust resistance were studied in the experiments with rust and Ceratocystis wilt: a *Eucalyptus urophylla* x *E. camaldulensis* hybrid and an *E. urophylla*. For leaf-spot, seedling of *E. urophylla* were tested. The experiments were repeated twice. The plantlets were cultivated under ambient and high CO₂ concentrations (ranging from 520 to 1,147 ppm) for at least 30 days before the inoculation of the pathogens. High CO₂ concentrations resulted in a decrease in diseases severity. Plant growth was stimulated by up to 23% in height and 26% in stem diameter in OTCs. Leaf area, dry matter mass and carbon content of the plants was greater at higher CO₂ concentrations. In this study, increased concentrations of atmospheric CO₂ favourably affected eucalypt growth and reduced diseases severity. This effect could potentially compensate for negative impacts from other environmental variables that are affected by climate change and should be considered in the development of adaptation strategies to address climate change.

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